

Amendment to the Claims

Claim 1 (withdrawn): A method for producing a heritable integration of a transgene within a genome of a somatic or germ line cell of an invertebrate organism, the method comprising:

providing a first DNA cassette within said genome, wherein said first cassette comprises a first flanking transposon half side, a second flanking transposon half side, and an internal transposon half side, wherein said internal transposon half side and said first flanking transposon half side form a pair of excisable transposon half-sides, and wherein said first cassette further comprises said transgene in-between the internal transposon half side and said second flanking transposon half side; and

mobilizing said excisable transposon half-sides.

Claim 2 (withdrawn): The method of claim 1, wherein said internal transposon half side and said second flanking transposon half side are TransposonL half sides, and wherein said first flanking transposon half side is a TransposonR half side.

Claim 3 (withdrawn): The method of claim 1, wherein said internal transposon half side and said second flanking transposon half side are TransposonR half sides, and wherein said first flanking transposon half side is a TransposonL half side.

Claim 4 (withdrawn): The method of claim 1, wherein said excisable transposon half-sides and corresponding transposase enzyme are from a transposable element, wherein said transposable element has terminal inverted sequences, and wherein said transposable element transposes via a DNA-mediated process.

Claim 5 (withdrawn): The method of claim 1, wherein said first DNA cassette further comprises a first selectable marker gene located between said internal transposon half side and said first flanking transposon half side, and a second selectable marker gene located between said internal transposon half side and said second flanking transposon half side, and wherein said first and second selectable marker genes are phenotypically distinguishable.

Claim 6 (withdrawn): The method of claim 5, wherein said first and second marker genes are, in either order, any combination of marker genes producing distinguishable fluorescent or other visible dominant phenotypes.

Claim 7 (withdrawn): The method of claim 5 wherein said first and second marker genes are, in either order, a combination of the transformation marker genes PUbDsRed1 and 3xP3-ECFP.

Claim 8 (withdrawn): The method of claim 1, wherein said internal transposon half side is provided in reverse orientation, wherein said excisable transposon is formed by inversion of said internal transposon half side relative to said first flanking transposon half side, wherein said internal transposon half side further comprises flanking recombinase sites, and wherein said inversion is catalyzed by a site-specific recombinase.

Claim 9 (withdrawn): The method of claim 8, wherein said recombinase sites are FRT sites in opposite or reverse orientation.

Claim 10 (withdrawn): The method of claim 1, wherein said excisable transposon is mobilized by a source of transposase corresponding to said excisable transposon to render the remaining genomic DNA immobilizable.

Claims 11-22 (cancelled)

Claim 23 (withdrawn): An invertebrate organism comprising the heritable transgene produced according to claim 1.

Claim 24 (cancelled)

Claim 25 (withdrawn): A method for producing a heritable integration of a transgene within a genome of a somatic or germ line cell of an organism, the method comprising:

providing a first DNA cassette within said genome, wherein said first cassette comprises a first flanking transposon half side, a second flanking transposon half side, and an internal transposon half side, wherein said internal transposon half side and said first flanking transposon half side form a pair of excisable transposon half-sides, and wherein said first cassette further comprises

said transgene in-between the internal transposon half side and said second flanking transposon half side; and

mobilizing said excisable transposon half-sides.

Claim 26 (withdrawn): The method of claim 25, wherein said internal transposon half side and said second flanking transposon half side are TransposonL half sides, and wherein said first flanking transposon half side is a TransposonR half side.

Claim 27 (withdrawn): The method of claim 25, wherein said internal transposon half side and said second flanking transposon half side are TransposonR half sides, and wherein said first flanking transposon half side is a TransposonL half side.

Claim 28 (withdrawn): The method of claim 25, wherein said excisable transposon half-sides and corresponding transposase enzyme are from a transposable element, wherein said transposable element has terminal inverted sequences, and wherein said transposable element transposes via a DNA-mediated process.

Claim 29 (withdrawn): The method of claim 25, wherein said first DNA cassette further comprises a first selectable marker gene located between said internal transposon half side and said first flanking transposon half side, and a second selectable marker gene located between said internal transposon half side and said second flanking transposon half side, and wherein said first and second selectable marker genes are phenotypically distinguishable.

Claim 30 (withdrawn): The method of claim 29, wherein said first and second marker genes are, in either order, any combination of marker genes producing distinguishable fluorescent or other visible dominant phenotypes.

Claim 31 (withdrawn): The method of claim 29, wherein said first and second marker genes are, in either order, a combination of the transformation marker genes PUBDsRed1 and 3xP3-ECFP.

Claim 32 (withdrawn): The method of claim 25, wherein said internal transposon half side is provided in reverse orientation, wherein said excisable transposon is formed by inversion of said internal transposon half side relative to said first flanking transposon half side, wherein said internal transposon half side further comprises flanking recombinase sites, and wherein said inversion is catalyzed by a site-specific recombinase.

Claim 33 (withdrawn): The method of claim 32, wherein said recombinase sites are FRT sites in opposite or reverse orientation.

Claim 34 (withdrawn): The method of claim 25, wherein said excisable transposon is mobilized by a source of transposase corresponding to said excisable transposon to render the remaining genomic DNA immobilizable.

Claims 35-46 (Cancelled)

Claim 47 (withdrawn): An organism comprising the heritable transgene produced according to claim 25.

Claim 48 (Cancelled)

Claim 49 (New): A method for targeting a heritable integration of a transgene within a genome of a somatic or germ line cell of an invertebrate organism, said method comprising:

integrating into said genome a first DNA cassette carrying a first transposon half side at one end, a second transposon half side in opposite orientation at the other end, a first wild-type/non-mutated recombinase target site, and a mutated second heterospecific recombinase target site, wherein the recombinase target sites are flanked between said transposon half sides,

exchanging said first DNA cassette for a second DNA cassette carrying the same target recombinase sites in the same orientation of said first DNA cassette, an internal transposon half side flanked by said target recombinase sites in the same orientation as said second transposon half side, and a transgene positioned between said internal half side and second recombinase site with the exchange mediated by a site-specific recombinase that catalyzes a DNA recombination reaction via homospecific recombinase target sites, wherein the transgene is inserted into genome; and

identifying that said transgene has been integrated into said genome.

Claim 50 (New): The method of claim 49, wherein said site-specific recombinase is FLP recombinase, and wherein said recombinase target sites are FRT sites or mutated derivatives of said FRT sites.

Claim 51 (New): The method of claim 49, wherein said site-specific recombinase is Cre recombinase, and wherein said recombinase target sites are loxP sites or mutated derivatives of said loxP sites.

Claim 52 (New): The method of claim 49, wherein said first cassette further comprises a marker gene coding region and a promoter DNA positioned between one of the target recombinase sites.

Claim 53 (New): The method of claim 49, wherein said first cassette further comprises a homing sequence to enhance pairing with said homospecific recombinase target sites in said second cassette.

Claim 54 (New): The method of claim 53, wherein said homing sequence comprises a DNA sequence hybridizing to a *Drosophila* linotte locus.

Claim 55 (New): The method of claim 49 further comprising the step of excising the transposon positioned by the first transposon half side and said internal half side with a transposase following the exchange of the first DNA cassette with said second DNA cassette, wherein the transgene is immobilized into said genome.

Claim 56 (New): The method of claim 52, wherein said second cassette further comprises a second marker gene coding region lacking a promoter for regulating its expression, and wherein, following the exchange of said first DNA cassette to said second DNA cassette, said second marker gene is placed under the control of said promoter derived from said first cassette.

Claim 57 (New): The method of claim 53, wherein said second cassette comprises the same homing sequence as said first cassette within said recombinase target sites.

Claim 58 (New): The method of claim 49, wherein said second cassette further comprises a pair of phenotypically distinguishable marker genes positioned between said internal half side and said recombinase target sites.

Claim 59 (New): The method of claim 58, wherein one of said marker genes lacks a promoter.

Claim 60 (New): An invertebrate organism comprising the heritable transgene produced according to claim 49.